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The History of Ultrahigh Carbon Steels

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ABSTRACT

The history and development of Ultrahigh Carbon Steels (i.e., steels containing between 1 and 2.1% C and now known as UHCS) are described. The early use of steel compositions containing carbon contents above the eutectoid level is found in ancient weapons from around the world. For example, both Damascus and Japanese sword steels are examples of hypereutectoid steels. Their manufacture and processing is of interest in developing an understanding of the role of carbon content in the development of modern steels. Although sporadic examples of UHCS compositions are found in the early part of this century, it was not until the mid 1970s that the modern study began. This study had its origin in the development of superplastic behavior in steels and the recognition that increasing the carbon content was of importance in developing that property. The compositions that were optimal for superplasticity involved the development of steels that contained higher carbon contents than conventional modern steels. It was discovered, however, that the room temperature properties of these compositions were of interest in their own right. Following this discovery a period of intense work began on understanding their manufacture, processing, and properties. The development of laminated composites containing UHCS was an important part of this history.

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